

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Service Rules for the 698-746, 747-762	)	WT Docket No. 06-150
and 777-792 MHz Bands	)	
	)	
Revision of the Commission's Rules to Ensure	)	CC Docket No. 94-102
Compatibility with Enhanced 911 Emergency	)	
Calling Systems	)	
	)	
Section 68.4(a) of the Commission's Rules	)	WT Docket No. 01-309
Governing Hearing Aid-Compatible Telephones	)	
	)	
Biennial Regulatory Review – Amendment of	)	WT Docket No. 03-264
Parts 1, 22, 24, 27, and 90 to Streamline and	)	
Harmonize Various Rules Affecting Wireless	)	
Radio Services	)	
	)	
Former Nextel Communications, Inc. Upper	)	WT Docket No. 06-169
700 MHz Guard Band Licenses and Revisions to	)	
Part 27 of the Commission's Rules	)	
	)	
Implementing a Nationwide, Broadband,	)	
Interoperable Public Safety Network in the 700	)	PS Docket No. 06-229
MHz Band	)	
	)	
Development of Operational, Technical and	)	
Spectrum Requirements for Meeting Federal, State	)	WT Docket No. 96-86
and Local Public Safety Communications	)	
Requirements Through the Year 2010	)	
	)	

**COMMENTS OF THE  
SATELLITE INDUSTRY ASSOCIATION**

The Satellite Industry Association (“SIA”) hereby files Comments in response to the *Further Notice of Proposed Rulemaking* (“*FNPRM*”) released by the Commission on April 27, 2007 in connection with the above-referenced proceedings.<sup>1</sup> In the *FNPRM*, the Commission

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<sup>1</sup> FCC 07-72 (Apr. 27, 2007) (“*FNPRM*”).

seeks comment on a proposal to alter the upper portion of the 700 MHz band plan and associated service rules in order to auction a single nationwide 10 MHz license consisting of the paired 757-762 MHz and 787-792 MHz bands (a new “E Block”) to a licensee that would be responsible for constructing and operating a common infrastructure to support a public safety broadband network as well as its own commercial broadband network. *FNPRM* at ¶¶ 277 et seq. The Commission also asks whether some or all public safety equipment operating on “E Block” spectrum should be capable of accessing satellites, and whether the “E Block” licensee should be required to incorporate satellite-based technology into its network infrastructure. *Id.* at ¶ 280.

While SIA takes no position as to whether the FCC should adopt this “E-Block” proposal, SIA does believe that satellites are an essential component of any 700 MHz public safety network. Satellites offer unique capabilities that meet the critical needs of emergency response providers for ubiquitous and interoperable communications networks, which the Commission and the public safety community have specifically recognized. Accordingly, SIA urges the Commission to (i) make a reasonable effort to ensure that as many 700 MHz public safety devices as possible have the capability to access a satellite system; and (ii) facilitate access to satellite-based infrastructure by any 700 MHz public safety network as a backup to terrestrial network infrastructure.

### **Background**

*Satellite Industry Association.* SIA is a U.S.-based trade association providing worldwide representation of the leading satellite operators, service providers, manufacturers, launch services providers, remote sensing operators, and ground equipment suppliers. SIA is the unified voice of the U.S. satellite industry on policy, regulatory, and legislative issues affecting the satellite business. SIA Executive Members include: Arrowhead Global Solutions Inc.; Artel Inc.; The

Boeing Company; Datapath, Inc., The DIRECTV Group; Globalstar, Inc; Hughes Network Systems LLC; ICO Global Communications; Integral Systems, Inc.; Intelsat, Ltd.; Iridium Satellite LLC; Lockheed Martin Corp.; Loral Space & Communications Inc.; Mobile Satellite Ventures LP; Northrop Grumman Corporation; SES Americom, Inc.; and TerreStar Networks Inc.; and Associate Members include: ATK Inc.; EchoStar Satellite LLC; EMC Inc.; Eutelsat Inc.; Inmarsat Inc.; IOT Systems; Marshall Communications Corp.; SES New Skies; Spacecom Corp.; Stratos Global Corp; SWE-DISH Space Corp; and WildBlue Communications, Inc.

*Further Notice of Proposed Rulemaking.* On April 25, 2007, the Commission adopted the *FNPRM*. Therein, the Commission seeks comment with respect to a number of issues related to the future of the 700 MHz band, including a proposal to auction a single nationwide 10 MHz “E Block” license to a licensee that would responsible for constructing and operating a common infrastructure to support a public safety broadband network as well as its own commercial broadband network.. *FNPRM* at ¶¶ 277 et seq. The Commission also asks whether some or all public safety equipment operating on this spectrum should be capable of accessing satellites, and whether the “E Block” licensee should be required to incorporate satellite-based technology into its network infrastructure. *Id.* at ¶ 280.

## **Discussion**

### **I. Satellites Offer Unique Capabilities that Meet the Critical Needs of Emergency Response Providers**

SIA takes no position as to whether the FCC should adopt the *FNPRM* proposal with respect to the creation of a single nationwide “E Block” license that will build out the 700 MHz broadband public safety network. However, SIA does believe that satellites are an essential component of *any* 700 MHz public safety network. Satellites offer unique capabilities that meet the critical needs of emergency response providers for ubiquitous and interoperable

communications networks. The Commission has specifically recognized the unique capabilities of satellite networks in meeting the needs of the public safety community, as have key government leaders and public safety officials.<sup>2</sup> Among the unique capabilities offered by satellites are the following:

*Ubiquitous Coverage.* Unlike any other communications technology, satellites are capable of providing truly ubiquitous coverage, from the most rural areas to the densest urban cores. This is critically important in remote areas that lack adequate telecommunications infrastructure.<sup>3</sup> Satellites thus alleviate the concern that a particular emergency site will be stranded because it is beyond the reach of terrestrial wireline or wireless networks.<sup>4</sup> Moreover, unlike terrestrial systems, satellite systems provide coverage not only of the nation's land mass, but also of its skies and waterways.<sup>5</sup> In addition, due to their nationwide footprint, satellites are

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<sup>2</sup> See Exhibit A, attached hereto. See also *Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Service in the Upper and Lower L-band*, Notice of Proposed Rulemaking, 11 FCC Rcd 11675, 11681 ¶ 12 (1996) (noting that satellites "provide emergency communications to any area in times of emergencies and natural disasters"); *Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service*, Notice of Proposed Rulemaking, 10 FCC Rcd 3230, ¶ 7 (1995) (noting that satellites "provide nationwide public safety coverage. . . . [and] could satisfy important requirements that cannot be economically satisfied by other means"); *Qualcomm Incorporated*, Order, DA 00-2438, ¶ 7 (Chief, Wireless Bureau, Oct. 30, 2000) (explaining that satellites "may provide an important additional emergency telecommunications resource, especially to callers located in remote and rural areas and callers located in underpopulated regions where neither landline nor terrestrial mobile services exists").

<sup>3</sup> See *Extending Wireless Telecommunications Services To Tribal Lands*, Report and Order and Further Notice of Proposed Rulemaking, 15 FCC Rcd 11794, ¶ 13 (June 30, 2000) ("Satellites also provide communications opportunities for communities in geographically isolated areas, such as mountainous regions and deep valleys, where rugged and impassable terrain may make service via terrestrial wireless or wireline telephony economically impractical.").

<sup>4</sup> See Amy Hancock, *The Disaster Relief Equation*, Satellite Communications, July 1, 2000 (quoting director of administration for the American Red Cross as stating "With satellite technology, we're fairly confident that wherever we go, the phone is going to work. This gives us the confidence that when we go out to a disaster relief scene, we'll be able to communicate and help the people affected by the disaster.").

<sup>5</sup> See *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/ 11.7-12.2 GHz Bands*, Report and Order, FCC 04-286 (January 6, 2005) ("ESV Order") (establishing licensing and service rules for Earth Stations on Vessels ("ESVs") in the C-band and Ku-band); *Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, Notice of Proposed Rulemaking, FCC 05-14 (February 9, 2005) (proposing rules for operation of aircraft earth stations in the Ku-band); *Boeing Company*, Order and Authorization, 16 FCC Rcd 22645 (Int'l Bur. & OET, 2001) ("Boeing Order") (permitting operation of two-way mobile terminals aboard aircraft in the Ku-band); *Flexibility for Delivery of Communications by Mobile Satellite*

the most effective technology for providing point-to-multipoint services, such as dispatch service, over a wide area.

*Robustness.* Satellites, located in space, are immune from the kinds of natural and man-made disasters that affect terrestrial infrastructure. Many satellite operators also have in-orbit spares in the event of a satellite failure. Satellites are not impacted by failures in the power grid or damage to underground telephone lines or terrestrial microwave towers. Moreover, satellite operators deploy their ground stations in geographically diverse locations to avoid a single point of failure. When local wireline or wireless terrestrial-based communications systems are impacted by a disaster, satellite systems are still able to provide critical communications capabilities.<sup>6</sup>

Some satellite offerings can be used to restore terrestrial systems that are having difficulty operating on the ground for whatever reason. For example, some satellite systems can be used as the backhaul to restore communications of wireless systems used by public safety personnel, enabling them to communicate with both private networks and the Public Switched Telephone Network. This restoral capability is a critical functionality that would be invaluable to Public Safety personnel in an emergency situation.

*Broadband Access.* In addition to conventional voice and data services, satellites can provide emergency responders with access to broadband applications. Satellites have provided live video feeds of a disaster scene back to a command center. Thus, satellites can serve as a

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*Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, Report and Order*, 18 FCC Rcd 1962, FCC 03-15, IB Docket No. 01-185 (February 10, 2003) (“*ATC Order*”), at ¶ 1 (“*ATC Order*”) (noting that MSS systems can provide mobile services “on land, in the air and over the oceans”).

<sup>6</sup> See Tom D. Soumas Jr. and Dave Robertson, *Satellite Communications for Public Safety*, Mobile Radio Technology, January 2000 (“The benefits of mobile satellite communications for rural areas is obvious, but important benefits exist for urban areas as well, where satellite systems can provide essential backup for existing terrestrial systems. In a metropolitan area, where there are multiple layers of excellent, modern communications facilities, there is still an inherent vulnerability to disruption from natural disasters, such as earthquakes in California, hurricanes in Florida, ice storms in Massachusetts and tornadoes in Kansas.”).

primary means of video communications in emergency situations or as a back-up in case terrestrial infrastructure is down. Satellites also can offer high speed data transfers and Internet and intranet access during emergencies.

*Interoperability.* Because satellites provide coverage of the entire nation, their operators can serve as a single point of contact for designing an interoperable communications network. The ability to coordinate efforts among multiple responders arriving at the same emergency site is significantly enhanced if the public safety organizations rely on compatible communications technologies. Due to their ubiquitous coverage, satellites can play an important role in facilitating interoperability on a local, state, and nationwide basis.

*Dynamic Spectrum Reassignment.* Satellite technology allows for the dynamic reassignment of spectrum resources to those geographic areas most in need of communications capabilities, such as a disaster site. As examples, a fixed satellite link within a continental-United States (“CONUS”) satellite beam could readily be reassigned to support a disaster recovery application anywhere in the country. Similarly, a mobile satellite service provider could divert switched capacity from one portion of the country to another to support a disaster recovery contingency. This geographic versatility is especially critical for ensuring back-up service for terrestrial-based services.

*Next-Generation Capabilities.* Satellite operators have been investing billions of dollars in next-generation systems that continue to offer even more advanced services. For example, in some cases, next-generation systems are and will be able to communicate with increasingly smaller, lighter, and more attractive portable terminals. These systems are increasingly more powerful and offer higher data rates and increased capacity. One of the key beneficiaries of this

significant investment in new satellite technology will be the public safety community, which can enjoy tremendous improvements in functionality on a ubiquitous basis.

## **II. The Commission Should Fully Leverage the Benefits of Satellite Communications in Facilitating Any 700 MHz Band Public Safety Network**

The Commission should leverage the benefits of satellites in crafting service rules for the use of public safety spectrum in the 700 MHz band. Specifically, SIA urges the Commission to require any nationwide 700 MHz public safety licensee to (i) make a reasonable effort to ensure that as many 700 MHz public safety devices as possible have satellite access capability; and (ii) facilitate access to satellite-based infrastructure by any 700 MHz public safety network as a backup to terrestrial network infrastructure.

*Public Safety User Equipment.* The Commission should ensure that as much public safety user equipment as possible is capable of operating in both the terrestrial 700 MHz band as well as one or more bands in which satellite systems operate. Multi-mode functionality can take various forms, including either (i) a single unit capable of communicating directly with terrestrial and satellite systems or (ii) a terrestrial handset connecting through an interoperability device which facilitates communication between satellite and terrestrial satellite communications devices.<sup>7</sup> Any multi-mode device requirements should apply to equipment used for both mobile and fixed applications. The ability to access a satellite network will ensure that public safety user equipment remains operable when the terrestrial infrastructure is destroyed, while avoiding unnecessary delays and inefficiencies. For example, while satellite operators and service providers worked around the clock to provide satellite equipment to first responders following Hurricane Katrina, for each handset and terminal provided, many other equipment requests were

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<sup>7</sup> For instance, such a unit might be an interoperability device that facilitates communications among multiple radio systems operating on different frequencies to simplify communications (i.e. cellular, land mobile, and satellite frequencies).

unmet. These problems could have been averted if state and local jurisdictions had access to satellite services.

Moreover, including satellite capability could ensure that any 700 MHz public safety network provides ubiquitous coverage in the near term. Satellites are uniquely capable of providing broadband coverage from the densest urban cores to the most rural areas, which may be beyond the reach of terrestrial wireline or wireless networks. Even the most ambitious deployment plan for a 700 MHz public safety network would take years to realize and leave hundreds of thousands of square miles unserved indefinitely, if not forever.

*Infrastructure.* The Commission also should require any nationwide 700 MHz public safety licensee to incorporate access to satellite-based technology into its network infrastructure. As noted above, terrestrial networks are vulnerable to disruption in the event of natural and man-made disasters, and this disruption can threaten the integrity of public safety communications networks when they are needed most. When such disruption occurs, satellite infrastructure that has been integrated into the network can be relied upon to bridge the dangerous gaps in communications caused by failing terrestrial infrastructure, by both providing an alternative communications path and assisting in restoral of the terrestrial network.

After Hurricane Katrina, the fixed satellite service providers and their resellers stepped in immediately to provide instant infrastructure and emergency voice, video, and data communications in the hard-hit areas. While significant, the ability of satellite providers to provide emergency communications equipment and infrastructure effectively was limited by their not having been included in pre-disaster planning. In the midst of chaos and highly imperfect information, emergency responders and satellite providers did their best to identify critical infrastructure needs and to leverage whatever excess satellite capacity and satellite



ground equipment happened to be available in order to meet those needs. Even so, satellite infrastructure was not able to be deployed as quickly or efficiently as it otherwise could have been due to a lack of appropriate network planning and configuration. As a result, some critical needs were unmet. Satellite capacity could have been leveraged far more efficiently if satellite access had been formally incorporated into the public safety network infrastructure and communications plans as an automatic back-up in the event of terrestrial failure, affording first responders redundant communications capabilities immediately.

### **Conclusion**

For the reasons discussed above, SIA urges the Commission to (i) make a reasonable effort to ensure that as many 700 MHz public safety devices as possible have the capability to access a satellite system; and (ii) facilitate the incorporation of satellite-based infrastructure into any 700 MHz public safety network as a backup to terrestrial network infrastructure.

Respectfully submitted,

SATELLITE INDUSTRY ASSOCIATION

A handwritten signature in black ink, appearing to read "David Cavossa", with a stylized flourish at the end.

May 23, 2007

David Cavossa, Executive Director  
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**EXHIBIT A**  
**SELECTED STATEMENTS RE: BENEFITS OF**  
**SATELLITES FOR PUBLIC SAFETY COMMUNICATIONS**

“If we learned anything from Hurricane Katrina, it is that we cannot rely solely on terrestrial communications. When radio towers are knocked down, satellite communications are, in some instances, the most effective means of communicating.”

– FCC Chairman Kevin J. Martin<sup>1</sup>

“The satellite industry made significant contributions in maintaining and re-establishing communications in the wake of Hurricane Katrina. And as I’ve said, I’m eager to see if satellites can play an even more prominent role in the public safety and homeland security area.”

– FCC Commissioner Michael J. Copps<sup>2</sup>

“Hurricanes Katrina, Rita, and Wilma taught us the critical importance of satellite communications for emergency first responders. I encourage the satellite industry to continue to innovate and create the next great new product.”

– FCC Commissioner Deborah Taylor Tate<sup>3</sup>

“The United States military utilizes satellites for ground communications, why can't the government put up communication satellites for Public Safety? We get satellite TV all over the United States, why not provide redundancy for first responders using similar technology?”

– A.D. Vickery, Assistant Chief, City of Seattle Fire Department<sup>4</sup>

“[S]atellite phones and satellite capabilities provide critical elements of the communications piece for the command level [of public safety communications].”

– David Boyd, Director of SAFECOM<sup>5</sup>

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<sup>1</sup> Testimony before the Subcommittee on Telecommunications and the Internet, Committee on Energy and Commerce, United States House of Representatives (Sep. 29, 2005).

<sup>2</sup> Responses of Commission Michael J. Copps to Pre-Hearing Questions from the Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet (Feb. 7, 2007).

<sup>3</sup> Statement of Commissioner Deborah Taylor Tate Re: *Annual Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services*, IB Docket No. 06-67 (Mar. 22, 2007).

<sup>4</sup> Testimony before the House Subcommittee on Emergency Preparedness, Science, and Technology (Apr. 12, 2006).

<sup>5</sup> Testimony before the House Subcommittee on Emergency Preparedness, Science and Technology (Oct. 26, 2005).

“After Katrina struck, [the use of mobile satellite radios] was often the only functional form of communications in the state.”

– *Hurricane Katrina: A Nation Still Unprepared*,  
Special Report of the Committee on Homeland Security and Governmental Affairs<sup>6</sup>

“Essential communications from the affected area [after Hurricanes Charley, Frances, and Jeanne] to the state emergency operations center would have been impossible without satellite capability.”

– Ben Holycross, Communications Manager of Polk County, Florida<sup>7</sup>

“Satellites also provide communications opportunities for communities in geographically isolated areas, such as mountainous regions and deep valleys, where rugged and impassable terrain may make service via terrestrial wireless or wireline telephony economically impractical.”

– Federal Communications Commission<sup>8</sup>

“The underlying infrastructure of a nationwide interoperable broadband mobile communications network should include a mobility and satellite component to enable emergency response providers the capability of ‘rolling in’ a mobile infrastructure that would quickly re-establish communications when permanent networks are temporarily incapacitated.”

“Further, the incorporation of commercial satellite services into either a private public safety or commercial interoperable network that also includes terrestrial wireless systems would help to ensure that effective communication services are available to emergency response providers.”

– Federal Communications Commission<sup>9</sup>

“[Satellites] . . . can meet rural public safety needs and provide emergency communications to any area in times of emergencies and natural disasters.”

– Federal Communications Commission<sup>10</sup>

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<sup>6</sup> *Hurricane Katrina: A Nation Still Unprepared*, Special Report of the Committee on Homeland Security and Governmental Affairs, Senate Rept. 109-322 (2006).

<sup>7</sup> *Mobile Radio Technology* (August 1, 2005).

<sup>8</sup> *Extending Wireless Telecommunications Services To Tribal Lands*, Report and Order and Further Notice of Proposed Rulemaking 15 FCC Rcd 11794, ¶ 13 (June 30, 2000).

<sup>9</sup> *Report to Congress On the Study to Assess Short-Term and Long-Term Needs for Allocations of Additional Portions of the Electromagnetic Spectrum for Federal, State and Local Emergency Response Providers*, 14 FCC Rcd 7772, at ¶¶ 28 and 48 (2005).

<sup>10</sup> *Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Service in the Upper and Lower L-band*, Notice of Proposed Rulemaking, 11 FCC Rcd 11675, 11681 ¶ 12 (1996).

“[Satellites] . . . can provide . . . communications in remote or rural areas not covered by terrestrially based mobile services, and can provide nationwide public safety coverage.”

– Federal Communications Commission<sup>11</sup>

“[Satellites] . . . may provide an important additional emergency telecommunications resource, especially to callers located in remote and rural areas and callers located in underpopulated regions where neither landline nor terrestrial mobile services exists.”

– Federal Communications Commission<sup>12</sup>

“Katrina was a wake up call for many in the public safety communications area. Satellite communications (‘Satcom’) allows communication after terrestrial systems have failed or been destroyed.”

– MA911.org, Emergency Branch of the Massachusetts Communications Supervisors Association<sup>13</sup>

“[T]here were resiliency successes in Katrina’s aftermath . . . Satellite networks, although taxed by extensive numbers of additional users, remained available and usable throughout the affected region.”

– Nancy J. Victory, Chair, The FCC’s Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks<sup>14</sup>

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<sup>11</sup> *Amendment of Section 2.106 of the Commission’s Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, Notice of Proposed Rulemaking*, 10 FCC Rcd 3230, ¶ 7 (1995).

<sup>12</sup> *Qualcomm Incorporated, Order*, DA 00-2438, ¶ 7 (Chief, Wireless Bureau, Oct. 30, 2000).

<sup>13</sup> MA911.org, *Satellite Communications For Public Safety*, MASSACHUSETTS COMMUNICATIONS SUPERVISORS ASSOCIATION, Feb. 2007, at <http://www.ma911.org/Technical/Katrina%20Lessons.htm>.

<sup>14</sup> Presentation at the Annual Defense Spectrum Summit (Dec. 7, 2006).

“While no single technology can fully support all of public safety’s communications’ requirements, the features of a non-terrestrial based platform provide a unique and important method for public safety to plan around the hazards of earth-based infrastructures that can be susceptible to all manners of natural and manmade catastrophes.”

– Association of Public-Safety Communications Officials<sup>15</sup>

“In the aftermath, there was much discussion about what went right, what went wrong and ways to lessen the impact of future storms. Several of my friends were down there, and upon their return we discussed their experiences. When I asked them what they believed was the major issue they encountered, the response was unanimous - communications... What they needed was a communications method that would allow long distance interaction without reliance upon terrestrial towers and networks. What they needed were satellite phones.”

– Steve Ashley, Retired Police Officer<sup>16</sup>

“The application for this technology in law enforcement/public safety is limitless,” said Aiken. “Information is key to the success of any public safety agency, whether law enforcement, fire or health. Satellite puts that information at your fingertips.”

– Captain Larry Aiken, Officer-in-Charge of Mobile Command Operations for the Escambia County, Florida Sheriff’s Office<sup>17</sup>

“Satellite increases the efficiency of the office and aids coordination with other agencies.”

– Sheriff Ron McNesby, Escambia County, Florida Sheriff’s Office<sup>18</sup>

“The benefits of mobile satellite communications for rural areas is obvious, but important benefits exist for urban areas as well, where satellite systems can provide essential backup for existing terrestrial systems. In a metropolitan area, where there are multiple layers of excellent, modern communications facilities, there is still an inherent vulnerability to disruption from natural disasters, such as earthquakes in California, hurricanes in Florida, ice storms in Massachusetts and tornadoes in Kansas.”

– *Satellite Communications for Public Safety*, Mobile Radio Technology, January 2000<sup>19</sup>

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<sup>15</sup> *First Responder’s Guide to Satellite Communications*, at 5, available at <http://www.sia.org/frg.htm>.

<sup>16</sup> Steve Ashley, Retired Police Officer, *Emergency Communications: What to Do When Your Regular Communications Go Down?*, Law Officer Magazine, Dec. 22, 2006, at <http://www.correctionsone.com/police-products/communications/satellite-communications/articles/1198794/>.

<sup>17</sup> *Satellite Technology’s Role In Police and Public-Safety Emergency Communications*, GROUND CONTROL, Nov. 11, 2003, at [http://www.groundcontrol.com/Escambia\\_Case\\_Study.pdf](http://www.groundcontrol.com/Escambia_Case_Study.pdf)

<sup>18</sup> *Satellite Technology’s Role In Police and Public-Safety Emergency Communications*, GROUND CONTROL, Nov. 11, 2003, at [http://www.groundcontrol.com/Escambia\\_Case\\_Study.pdf](http://www.groundcontrol.com/Escambia_Case_Study.pdf)

<sup>19</sup> Tom D. Soumas Jr. and Dave Robertson, *Satellite Communications for Public Safety*, Mobile Radio Technology, January 2000.